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Revision Log

BEAMLINE:	Test Result: ☐ Passed ☐ Failed	
Test Reason:	Test Type: ☐ Full ☐ Partial	
Test Date:	Start Time:	Finish Time:
Tester 1:	Assistant 1:	
Tester 2:	Assistant 2:	

PREPARATION:

Inform control room operator that test will be done. _____

Obtain additional test keys - Refer to Table 1 for a listing of additional Keys. _____

Turn off 'Red Tag' switch on x-ray ring interlock and apply LOTO to X-Ray Security system. _____

Verify that vacuum valves and water interlocks are OK on the beam lines that will be checked for Phase I beamlines or connect user interlock test jumper. _____

1. *Search Sequence*:
   Search the hutch

   The overhead lights go out _____
   The red interior light comes on _____
   The audible alarm sounds for 13 to 15 seconds minimum _____

   The hutch interlock sign turns on _____

2. Open hutch door

   The hutch interlock sign goes out _____

3. If hutch has more than one check station, press second check station (CS-2).

   Nothing happens _____

   Press CS-1, exit hutch, close door, press CS-E.

   Interlock does not activate _____

4. Press CS-1, close hutch door and wait.

   Hutch interior lights come on in not more than 20 seconds for small hutches and not more than 50 seconds for large hutches. _____

   Press CS-E.

   Interlock does not activate _____

5. Press interior search buttons in order, close door, press CS-E, note that alarm comes on, open and close door, press CS-E again. (This must all be done in less than the timeout interval noted in step 4)

   Interlock does not activate _____

6. *Shutter Enable*:
Place latch device on door lock(s) so key can be removed. Place switch holders on door switches. Search hutch, put door key in SRU and turn. Open photon shutter, if equipped.
The Safety Shutter "enable" light does not come on until the end of the warning interval _____

7. *Emergency Stops*:
Total number of Emergency Stops in hutch ____

The person inside presses an Emergency Stop Button.	**ES1**	**ES2**	**ES3**
The shutter "enable" light goes out	_____	_____	_____
The ES indicator comes on	_____	_____	_____
The ES latch cannot be reset unless the SOR key is turned	_____	_____	_____

Repeat step 7 for each ES button.

8. *Door Switches*: Search hutch Open safety shutter and photon shutter (if equipped).
The "Beam On" sign turns ON ____

	Door:					
	1	**2**	**3**	**4**	**5**	**6**
Remove holder from switch 2. RIB latch light comes ON	____	____	____	____	____	____
9. Replace holder on switch 2. RIB cannot be reset unless SOR key is turned.	____	____	____	____	____	____
10. Remove holder on switch 1.						
Safety shutter closes	____	____	____	____	____	____
Photon shutter closes	____	____	____	____	____	____
RIA latch light comes on	____	____	____	____	____	____
Hutch interlock drops out	____	____	____	____	____	____
"Beam On" sign goes out	____	____	____	____	____	____
RIA can't be reset w/o SOR	____	____	____	____	____	____

Replace holder on switch 1.

11. *Solenoid Release Units (SRU)/Key Banks*:
Search hutch, leave shutter closed.

Hutch Kirk key (KKH) cannot be removed from SRU unless button is pushed _____

12. Open safety shutter and photon shutter (if equipped).

KKH cannot be removed even if button is pushed _____

13. Close shutters. Turn KKH and note where solenoid unit stops rotation. Push the button and turn key just beyond this point, but not far enough to actuate "key removed" switch. Release the button and leave key in this position. Open shutter(s), remove KKH, and replace.

RIA latch light comes on	_____
RIB latch light comes on	_____
The safety shutter closes	_____
The photon shutter closes	_____

Note: Steps 14 & 15 involve the removal of the transfer/lockout key. Complete action steps 14 & 15a if the interlock system contains an SRU designated for the transfer/lockout key and is separate from the Hutch KK SRU. Complete action step 15b only, if the interlock system contains a transfer key bank that is wired to the control panel and there is no SRU solely designated for the transfer key. The response should be the same for either test.

14. With hutch interlocked, leave shutter(s) closed.

Beam line transfer key can be removed only if button on SRU is pushed	_____

Open safety shutter. (Photon shutter remains closed)

Beam line transfer key can't be removed even if button is pushed	_____

15. Close safety shutter.

15a. SRU test: "Cheat" SRU as described in step 13. Open safety shutter, remove the key and replace.

15b. Transfer key Bank: Obtain spare transfer bank key (see Table 1). Insert spare key in transfer bank and turn to the enable position. Open Safety Shutter

RIA latch light comes on	_____
RIB latch light comes on	_____
The safety shutter closes	_____
SPA comes on	_____
SPA can't be reset w/o SOR	_____

Reset RIA and RIB

16. *Emergency Stop*: Open photon and safety shutter. Press an emergency stop button.

RIA latch light comes on	_____
RIB latch light comes on	_____
Hutch interlock drops out	_____
ES indicator comes on	_____
Safety Shutter Closes	_____
Photon Shutter Closes (if equipped)	_____

17. *Photon Shutter Function*:

Observe the photon shutter while it is opened and closed.

The mechanism moves freely and without hesitation	_____

18. *Shutter Enable Key*:

Open the safety shutter. Remove the Control Room Shutter Enable Key for this beam line, then replace the key.

The safety shutter closes	_____
RIA latch light comes on	_____
The "Control Room Shutter Enable" light goes out	_____
The SPA latch comes on (after the key is back on)	_____
The safety shutter cannot be opened	_____

Reset RIA and SPA

19. *Master Shutter Control*:
Open the Safety Shutter.
Turn "Auto Open" key to "ON" (if key switch is installed on beamline).
At the Control Room Operator's Console, switch the shutter master enable to "Inhibit" and back to "Enable"

The safety shutter closes _____
And then re-opens _____

Turn "Auto Open" key to "OFF" - Disregard this step if key switch is not installed.
Switch the master enable to "Inhibit" and back to "Enable"

The safety shutter closes _____
And does NOT re-open _____

20. *Reach-Back*:
One person goes to the x-ray equipment area and resets the indicators for RIAX and RIBX at SR100.
Open the safety shutter and photon shutter (if equipped).
Remove switch holder from door **switch number 2**.

RIB latch light comes on _____
RIBX "Loop Enabled" indicator goes out _____
RIBX "Loop Disabled" indicator comes on _____

Replace switch holder.

RIBX cannot be reset _____

Reset RIB

RIBX CAN be reset
("Loop Enabled" indicator comes on) _____

21. Remove holder from door **switch 1**.

RIA latch light comes on _____
RIAX "Loop Enabled" indicator goes out _____
RIAX "Loop Disabled" indicator comes on _____
The safety shutter closes _____
The photon shutter closes (if equipped) _____
RIAX cannot be reset _____

Reset RIA

RIAX CAN be reset
("Loop Enabled" indicator comes on) _____

22. *Door Switch Function*: Remove the holders from the switches. Remove the latch device from the door lock(s). Stand inside the hutch and open and close the door.

All door switches operate freely and each makes a "click" when door is opened

(Complete test for each set of door switches)	**Door:**					
	1	**2**	**3**	**4**	**5**	**6**
	____	____	____	____	____	____

23. *Safety Shutter Function*:
Search the hutch. Locate the safety shutter associated with the beam line by tracing the beam pipe through the shield wall. Do not rely on labels on the shutter mechanism. Open the shutter.

The correct shutter opens _____
No other shutter at that saw tooth opens or attempts to open _____

Close the safety shutter.

The mechanism moves freely and without hesitation _____

24. Remove user interlock test jumper (if applicable). _____

Table 1:

SYSTEM	TRANSFER KEY #
X7A	15980
X12A	15999
X15A	16330
X19C	15983

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